

WHAT IS CLAIMED IS:

- 1                   1.     A system for repositioning teeth from an initial tooth arrangement  
2     to a final tooth arrangement, said system comprising a plurality of dental incremental  
3     position adjustment appliances including:  
4                   one or more appliances, each having a geometry selected to reposition the  
5     teeth from a first arrangement to a second arrangement, wherein the appliances comprise  
6     polymeric shells having cavities and wherein the cavities of successive shells have  
7     different geometries shaped to receive and resiliently reposition teeth from the first to the  
8     second arrangement; and  
9                   one or more wire and bracket systems to progressively reposition the teeth  
10    from one arrangement to a successive arrangement, the wire and bracket systems and  
11    appliances being deployed in seriatim to reposition teeth from the initial tooth  
12    arrangement to the final tooth arrangement.
- 1                   2.     A system as in claim 1, wherein the tooth positions defined by the  
2     cavities in each successive appliance differ from those defined by the prior appliance by  
3     no more than 2 mm.
- 1                   3.     A system as in claim 1, comprising at least two intermediate  
2     appliances.
- 1                   4.     A system as in claim 3, comprising at least ten intermediate  
2     appliances.
- 1                   5.     A system as in claim 4, comprising at least twenty-five  
2     intermediate appliances.
- 1                   6.     A method for repositioning teeth from an initial tooth arrangement  
2     to a final tooth arrangement, said method comprising the following steps performed in a  
3     preselected order:  
4                   successively placing three or more appliances having geometries selected  
5     to progressively reposition the teeth from a first arrangement to successive arrangements;  
6     and  
7                   placing one or more wire and bracket systems to progressively reposition  
8     the teeth from one arrangement to a successive arrangement, the brackets and appliances

9 being deployed in seriatim to reposition teeth from the initial tooth arrangement to the  
10 final tooth arrangement.

1 7. A method as in claim 6, where the tooth positions defined by the  
2 cavities in each successive appliance differ from those defined by the prior appliance by  
3 no more than 2 mm.

1 8. A method as in claim 6, wherein the successively placing step  
2 comprises placing at least two additional appliances prior to placing the final appliance.

1 9. A method as in claim 8, wherein the successively placing step  
2 comprises placing at least ten additional appliances.

1 10. A method as in claim 9, wherein the successively placing step  
2 comprises placing at least twenty-five additional appliances.

1 11. A method as in claim 6, wherein the appliances are successively  
2 replaced at an interval in the range from 2 days to 20 days.

1 12. An improved method for repositioning teeth using appliances  
2 comprising polymeric shells having cavities shaped to receive and resiliently reposition  
3 teeth to produce a final tooth arrangement, wherein the improvement comprises  
4 determining at the outset of treatment geometries for at least three appliances to be used  
5 in combination with at least one wire and bracket system, the appliances are to be worn  
6 successively by a patient to reposition teeth from an initial tooth arrangement to the final  
7 tooth arrangement, wherein the cavities of successive shells have different geometries.

1 13. An improved method as in claim 12, wherein at least four  
2 geometries determined at the outset.

1 14. An improved method as in claim 13, wherein at least ten  
2 geometries are determined at the outset.

1 15. An improved method as in claim 14, wherein at least twenty-five  
2 geometries are determined at the outset.

1 16. An improved method as in claim 12, wherein the tooth positions  
2 defined by the cavities in each successive appliance differ from those defined by the prior  
3 appliance by no more than 2 mm.

1 17. A method as in claim 16, comprising at least two intermediate  
2 appliances.

1 18. A method as in claim 17, comprising at least ten intermediate  
2 appliances.

1 19. A method as in claim 18, comprising at least twenty-five  
2 intermediate appliances.

1 20. An improved method for repositioning teeth using appliances  
2 comprising polymeric shells having cavities shaped to receive and resiliently reposition  
3 teeth to produce a final tooth arrangement, wherein the at least three appliances are  
4 applied successively to a patient's teeth to reposition the teeth, wherein the improvement  
5 comprises repositioning the teeth using a wire and bracket system to initially reposition  
6 the teeth prior to applying the polymeric shell appliances.

1 21. An improved method as in claim 20, wherein at least four  
2 appliances are applied to the teeth.

1 22. An improved method as in claim 21, wherein at least ten appliances  
2 are applied to the teeth.

1 23. An improved method as in claim 22, wherein at least twenty-five  
2 appliances are applied to the teeth.

1 24. An improved method as in any of claims 20-23, wherein initially  
2 repositioning the teeth using a wire and bracket system configures the teeth to render  
3 them amenable to treatment with polymeric appliances.

1 25. An improvement as in claim 24, wherein initially repositioning the  
2 teeth alleviates at least one of the following conditions:

3 A-P correction of greater than 2 mm;  
4 autorotation of the mandible required for vertical/A-P correction;

5 CR-CO discrepancy correction/treatment to other than centric occlusion;  
6 correction of moderate to severe rotations of premolars and/or canines  
7 that are greater than 20 degrees;  
8 severe deep bite opened to ideal or open bite to be closed to ideal;  
9 extrusion of teeth greater than 1 mm other than as part of torquing or in  
10 conjunction with intruding adjacent teeth;  
11 teeth tipped by more than 45 degrees;  
12 multiple missing teeth;  
13 crowns less than 70% of normal size;  
14 posterior open bite; and  
15 movement of entire arch required for A-P correction.

1 26. A method for treating a dental malocclusion, said method  
2 comprising:  
3 providing criteria to distinguish between a less severe malocclusion and a  
4 more severe malocclusion;  
5 determining whether an individual patient's malocclusion is more severe  
6 or less severe according to the criteria;  
7 if the malocclusion is determined to be less severe, treating the patient  
8 with a plurality of successive polymeric shell appliances having different geometries  
9 selected to resiliently reposition teeth to a final desired arrangement; and  
10 if the malocclusion is determined to be more severe, treating the patient  
11 successively in a predetermined order with (a) at least one wire and bracket system, and  
12 (b) a plurality of successive polymeric shell appliances having different geometries  
13 selected to resiliently reposition teeth, wherein the combined treatment repositions the  
14 teeth to a final desired arrangement.

1 27. A method as in claim 26, wherein the criteria which are  
2 characteristic of a more severe malocclusion include at least some of the following:  
3 A-P correction of greater than 2 mm;  
4 autorotation of the mandible required for vertical/A-P correction;  
5 CR-CO discrepancy correction/treatment to other than centric occlusion;  
6 correction of moderate to severe rotations of premolars and/or canines  
7 that are greater than 20 degrees;

8 severe deep bite opened to ideal or open bite to be closed to ideal;  
9 extrusion of teeth greater than 1 mm other than as part of torquing or in  
10 conjunction with intruding adjacent teeth;  
11 teeth tipped by more than 45 degrees;  
12 multiple missing teeth;  
13 crowns less than 70% of normal size;  
14 posterior open bite; and  
15 movement of entire arch required for A-P correction.

1 28. A method as in claim 27, wherein the absence of some or all of the  
2 criteria characteristic of a severe malocclusion indicates that it is a less severe occlusion.

1 29. A method as in any of claims 26-28, wherein providing criteria  
2 comprises providing a list of criteria.

1 30. A method as in claim 26, wherein determining whether the  
2 malocclusion is more or less severe comprises obtaining a model of the patient's teeth.

1 31. A method as in claim 30, wherein the model is a cast.

1 32. A method as in claim 30, wherein the model is digital.

1 33. A method as in claim 26, wherein determining whether the  
2 malocclusion is more or less severe comprises visually observing the patient's teeth.

1 34. A method as in claim 26, wherein the predetermined order is to  
2 treat the patient's teeth first with the wire and bracket system to partially reposition the  
3 teeth until the malocclusion is less severe according to the criteria and then treating the  
4 patient with the polymeric shell appliances.

1 35. A method as in claim 26, wherein the predetermined order is to  
2 treat the patient's teeth first with the polymeric shell appliances and then with the wire  
3 and bracket system.

1 36. A method as in claim 26, wherein treating the patient with a  
2 plurality of successive polymeric shell appliances comprises successively placing at least  
3 three appliances each over a time period in the range from one to four weeks.

1                    37.    A method as in claim 36, wherein at least ten successive polymeric  
2    appliances are placed.

1                    38.    A method as in claim 36, wherein at least twenty-five successive  
2    polymeric appliances are placed.